

A Survey that Established a Baseline Population Data Set for Odonata Species in Jay Cooke State Park, Carlton County, Minnesota

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Abstract

In an effort to create a baseline population data set of Odonata in Jay Cooke State park a survey was conducted from May 29, 2013 to September 26, 2013 by using hand-netting techniques, in the field identification on live specimens, as well as proper treatment, storage and documentation of caught specimens. The purpose of this survey was to create an online accessible data set that can be used in the future for research on topics such as climate change, watershed health and other ecological issues being that Odonata are bio-indicators of ecosystem health due to their obligate aquatic nymph forms. Only 3 adult males were collected of each species found to ensure no damage to future populations. Contrasted to population data previously reported there were 11 species added from the 2013 survey to the list of documented species found in Carlton County. These newly documented 11 species were part of the 35 different species caught from a total of 67 specimens collected.

Introduction

There are many issues threatening the Northern Minnesotan ecosystem including climate change, maintaining native biodiversity, invasive species and habitat management and in an effort to document the damage done as well as try to prevent damage it is necessary to establish a baseline population data set for a bio-indicator like Odonata. Global assessments of Odonata species tend to be lacking as up to 30% of Odonata species are undersurveyed and an assessment of their conservation status cannot be made (Clausnitzer, Kalkman et al. 2009) and this would only increase with problems like habitat loss. Without a baseline data set there is no data to tell which Odonata are missing currently from the previous populations found in Carlton County. Various habitats are present in Jay Cooke including both lentic (non-moving water) and lotic (flowing water) environments in the forms of streams, bogs, ponds, river banks, and lakes which all harbor various Odonata species which provide a model surveying area which could help provide insight for the future of Minnesota's Odonata species based on the results of the survey.

The issues being faced by Minnesota today may have direct effects on the populations of Odonata and the specific problem of climate change threatens the ranges of native Odonata species as most species have preferred habitats (Beatty, Fraser 2010). If the climate warms as predicted then these ranges for native species will shift to compensate for the increased temperature of the environment. Another problem being faced is invasive species being that native species encounter challenges like deforestation due to insects like gypsy moth or emerald ash borer and habitat changes could make resources for native species very scarce and cause

populations to dwindle. With these impending ecological threats a way to measure possibly damage to the environment is invaluable and this survey provides a baseline data set that can be used once these threats move through Minnesota.

Methods

The survey was conducted from May 29, 2013 to September 26, 2013 approximately once a week on days that were sunny with low wind. Using hand-netting techniques we caught specimens and used field guides to identify the specimens in the field to prevent errors due to coloration changes later in the processing stage. Specimens that were kept in the field were stored in wax paper envelopes with labels that contained date and location data written in pencil. After leaving the survey site the collected specimens were processed by soaking them in acetone for 24 to 48 hours. The processed specimens were then put into preservation envelopes with acid free stock cards that had location, weather, date, common name and species name printed on them. An electronic spreadsheet record was kept to ensure that a maximum of 3 males of each species were taken. The 1st specimen collected would go to Kurt Mead at the Minnesota Odonata Survey Project, the second specimen collected would go to Jay Cooke State Park, and the third specimen collected would stay at UMD in the insect museum collection. In the off chance that a female was caught it was kept if it was the only specimen of that species found or if it was damaged in capture or identification.

Results

At the end of the survey 67 specimens had been collected consisting of 35 different species; 11 of which were newly recorded in the county compared to data previously reported by Kurt Mead in October 2010 and Rachel MaKarrall in 2012.

Table 1.

| Scientific Name | Common Name | Total Collected | Sex |
|---------------------------------|------------------------|-----------------|--------|
| <i>Anax junius</i> | Common Green Darner | 1 | Male |
| <i>Leucorrhinia intacta</i> | Dot-tailed Whiteface | 2 | Male |
| <i>Coenagrion resolutum</i> | Taiga Bluet* | 3 | Male |
| <i>Libellula quadrimaculata</i> | Four-Spotted Skimmer | 3 | Male |
| <i>Enallagma annexum</i> | Northern Bluet | 2 | Male |
| <i>Epitheca canis</i> | Beaverpond Baskettail | 1 | Female |
| <i>Enallagma clausum</i> | Alkali Bluet* | 2 | Male |
| <i>Ischnura verticalis</i> | Eastern Forktail | 1 | Male |
| <i>Ladona julia</i> | Chalk-Fronted Corporal | 1 | Male |
| <i>Didymops transversa</i> | Stream Cruiser* | 1 | Male |
| <i>Cordulia shurtleffii</i> | American Emerald | 2 | Male |
| <i>Nehalennia irene</i> | Sedge Sprite | 2 | Male |

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|-------------------------------|---------------------------|---|--------|
| <i>Epitheca spinigera</i> | Spiny Baskettail | 1 | Male |
| <i>Argia moesta</i> | Powdered Dancer* | 3 | Male |
| <i>Enallagma exsulans</i> | Stream Bluet* | 2 | Male |
| <i>Calopteryx maculata</i> | Ebony Jewelwing* | 3 | Male |
| <i>Calopteryx aequabilis</i> | River Jewelwing | 2 | Male |
| <i>Argia tibialis</i> | Blue-Tipped Dancer* | 1 | Male |
| <i>Enallagma ebrium</i> | Marsh Bluet | 3 | Male |
| <i>Leucorrhinia proxima</i> | Belted Whiteface | 3 | Male |
| <i>Celithemis eponina</i> | Halloween Pennant | 2 | Male |
| <i>Aeshna eremita</i> | Lake Darner | 2 | Male |
| <i>Enallagma hageni</i> | Hagen's Bluet* | 2 | Male |
| <i>Libellula luctuosa</i> | Widow Skimmer | 1 | Female |
| <i>Sympetrum obtrusum</i> | Whitefaced Meadowhawk | 3 | Male |
| <i>Enallagma civile</i> | Familiar Bluet* | 1 | Male |
| <i>Aeshna umbrosa</i> | Shadow Darner | 3 | Male |
| <i>Lestes rectangularis</i> | Slender Spreadwing | 1 | Male |
| <i>Lestes unguiculatus</i> | Lyre-Tipped Spreadwing* | 2 | Male |
| <i>Pantala flavescens</i> | Wandering Glider | 2 | Male |
| <i>Lestes disjunctus</i> | Northern Spreadwing | 1 | Male |
| <i>Lestes dryas</i> | Emerald Spreadwing* | 1 | Male |
| <i>Sympetrum rubicundulum</i> | Ruby Meadowhawk | 3 | Male |
| <i>Sympetrum costiferum</i> | Saffron-Winged Meadowhawk | 2 | Male |
| <i>Sympetrum vicinum</i> | Autumn Meadowhawk | 2 | Male |

* indicates Carlton County Record

Conclusions

The survey was conducted almost entirely by two people and in the future would benefit from having many more people and thus many more nets that could catch potential specimens. Another aspect to look into is the possibility of surveying populations based on found exuvia (the shed skin of a juvenile upon molting into an adult) as they can still be identified to species and would not kill any live specimens, however this would be a very time consuming process. In conclusion the specimens that were collected were of great benefit to establishing the baseline population data set and with continued survey could prove to be a very useful piece of data. The occurrence of county records indicates that the area is under-surveyed and that more work should be done to complete and reinforce the species listed as present in Jay Cooke State Park and ultimately Carlton County.

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